

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A viscous fluid clutch for use in a vehicle comprising:
a rotor having a rotor hub driven by an input shaft and a rotor surface having an end connected to an outer periphery of the rotor hub, the rotor surface including:

a first portion;

a second portion; and

a grooved portion disposed between the first and second portions;

wherein the first portion, the second portion, and the groove portion are formed by a single piece;

wherein the grooved portion forms a W-shaped profile; ~~and, wherein the grooved portion which forms the W-shaped profile is formed by a single piece;~~

wherein the first and second portions of the rotor each have a thickness sufficiently greater than a thickness of the grooved portion such that a magnetic flux path in the fluid clutch will have a substantial portion of a magnetic field flow around the grooved portion as compared to a portion of the magnetic field flow that flows through the grooved portion.

2. (Currently amended) A magnetorheological fluid clutch, comprising:

an input shaft;

a coil assembly for generating a magnetic field;

a housing comprising a stator; and

a rotor disposed in the housing;

wherein the rotor includes a radially extending hub driven by the input shaft and an annular rotor ring connected to the hub;

wherein the rotor ring includes a first portion, a second portion, and a portion of reduced thickness disposed between the first and second portions to prevent a shunt in the magnetic field[[, and]];

wherein the first portion, the second portion, and the portion of reduced thickness are formed by a single piece; and

wherein the rotor includes a grooved portion which forms a W-shaped profile at the portion of reduced thickness, ~~wherein the grooved portion which forms the W-shaped profile is formed by a single piece.~~

3. (Previously Presented) The magnetorheological fluid clutch of claim 2, wherein a thickness of the first portion and a thickness of the second portion are at least seven times greater than the thickness of the portion of reduced thickness.

4. (Original) The magnetorheological fluid clutch of claim 2, wherein the portion of reduced thickness is formed to include grooves and protrusions.

5. (Previously Presented) The magnetorheological fluid clutch of claim 4, wherein the grooves and protrusions form the W-shaped profile.

6. (Original) The magnetorheological fluid clutch of claim 2, wherein the portion of reduced thickness is formed without cutting.

7. (Original) The magnetorheological fluid clutch of claim 2, wherein the rotor ring comprises a ferrous metal.

8. (Original) The magnetorheological fluid clutch of claim 2, wherein the rotor ring comprises a non-ferrous material.

9. (Original) A fan drive assembly for use in a vehicle, the fan drive assembly including the magnetorheological fluid clutch of claim 2.

10-48. (Cancelled)

49. (Currently amended) A fluid clutch for use in a vehicle, the fluid clutch including a rotor having a rotor hub driven by an input shaft and a rotor surface having an end connected to an outer periphery of the rotor hub, the fluid clutch comprising:

the rotor surface including a first portion, a second portion, and a roll formed portion disposed between the first and second portions,

wherein the first and second portions of the rotor each have a thickness sufficiently greater than a thickness of the roll formed portion such that a magnetic flux path in the fluid clutch will have a substantial portion of a magnetic field flow around the roll formed portion as compared to a portion of the magnetic field flow that flows through the roll formed portion;

wherein the first portion, the second portion, and the roll formed portion are formed by a single piece; and

wherein the roll formed portion includes a grooved portion which forms a W-shaped profile, ~~wherein the grooved portion which forms the W-shaped profile is formed by a single piece.~~

50. (Original) The fluid clutch of claim 49, wherein the roll formed portion of the rotor has a saw tooth profile.

51. (Previously Presented) The fluid clutch of claim 49, wherein the grooved portion of the rotor further has a W-W shaped profile.

52. (Currently amended) A magnetorheological fluid clutch, comprising:
an input shaft;

a coil assembly for generating a magnetic field;

a housing comprising a stator; and

a rotor disposed in the housing,

wherein the rotor includes a radially extending hub driven by the input shaft and an annular rotor ring connected to the hub, and

wherein the rotor ring includes a first portion, a second portion, and a thinned center portion disposed between the first and second portions to prevent a shunt in the magnetic field[[, and]];

wherein the first portion, the second portion, and the thinned center portion are formed by a single piece; and

wherein the rotor includes a grooved portion which forms a W-shaped profile at the thinned center portion, ~~wherein the grooved portion which forms the W-shaped profile is formed by a single piece.~~

53. (Previously Presented) The magnetorheological fluid clutch of claim 52, wherein the rotor includes a roll formed portion disposed between the first and second portions that comprises the thinned center portion,

wherein a thickness of the first portion and a thickness of the second portion are at least seven times greater than a thickness of the rolled portion.

54. (Previously Presented) The magnetorheological fluid clutch of claim 53, wherein the roll formed portion is formed without cutting.

55-61. (Cancelled)

62. (Withdrawn) A method of making a rotor assembly for use in a viscous fluid clutch, the method comprising the steps of:

providing a magnetic material;

forming the magnetic material into a rotor ring;

roll forming the rotor ring to include a thinned central portion, wherein the first and second portions each have a thickness greater than a thickness of the thinned central portion;

providing a hub member; and

connecting the rotor ring to the hub member.

63. (Withdrawn) The method of claim 62, wherein the step of forming the magnetic material into a rotor ring includes the steps of providing a sheet of the magnetic material, cup drawing the magnetic material into a cup-shaped member, trimming the cup-shaped member to form a ring, and roll forming the ring.

64. (Withdrawn) The method of claim 63, further comprising the step of stamping the hub member and forming a curved portion between an inner periphery of the hub member and an outer periphery of the hub member.

65. (Withdrawn) The method of claim 62, wherein the step of connecting the rotor ring to the hub member includes crimping one of the first portion and the second portion of the rotor ring to an outer periphery of the hub member.

66-71. (Cancelled)

72. (Previously Presented) The magnetorheological fluid clutch of claim 2, wherein the rotor includes an outer radial surface and an inner radial surface, with each of the outer radial surface and the inner radial surface including grooved portions forming the W - shaped profile.